

## REMARKS

### I. Drawing Corrections

The drawing was objected to under 37 C.F.R. 1.83 (a) for failing to show each and every feature of the claimed invention. The "parabolic collector" was not illustrated in the original drawing figures.

A new figure 4 that was filed with the supplemental amendment dated February 22, 2005 was not in compliance with 37 C.F.R. 1.121 (d) because it was not correctly labeled. A replacement figure 4 that is correctly labeled "replacement sheet" and is in compliance with 37 C.F.R. 1.121 (d) accompanies and/or is attached to this amendment. The figure captions in the specification have already been appropriately amended.

Figure 4 shows the parabolic collector according to the invention including the absorber pipe according to the invention as described in the specification. Thus the new figure 4 overcomes the objection to the drawing.

In addition, during review of the drawing it was noted that drawing reference number 14 on fig. 2 was not described in the current specification because the parts list in priority document was deleted during translation. The description of the embodiment of fig. 2 has been amended to include a sentence describing the relationship of the element labeled 14 to the other parts of this embodiment. This relationship is apparent from fig. 2, i.e. from the figure itself, and thus the addition of the descriptive sentence is not "new matter".

Also the inner end of the bellows 11 (i.e. the opposite end of the bellows 11 from the "outside" end 13 – as described in the specification) is labeled "12" in the figures. For that reason the disclosure on page 12 of the specification was amended to include this reference number.

No new matter regarding the changes in the above paragraph has been entered because there is basis for these changes in the figures and specification, as explained in more detail below.

For the foregoing reasons, withdrawal of the objection to the drawings under 37 C.F.R. 1.83 (a) is respectfully requested.

#### **II. Objection to Claim 45**

The typographical error in claim 45 has been corrected by the above changes.

For the foregoing reasons and because of the changes in claim 45, withdrawal of the objection to claim 45 is respectfully requested.

#### **III. Indefiniteness Rejection and Specification Changes**

Claims 39 to 64 were rejected under 35 U.S.C. 112, second paragraph, for indefiniteness.

##### **1. Response to the 2nd paragraph of Reasons for the 112 Rejection**

Claims 39 and 52 have been amended to delete the term "under" and use the wording suggested by the last 3 lines of this paragraph on page 4 of the

Office Action to more clearly describe the position of the folding bellows 11. The bellows is described as "between the glass transitional element and the central metal pipe". This description does not depend on the direction in which the absorber pipe is viewed or the observer is located and thus the amended wording is definite. The term "under" does not occur in the other claims.

It should be noted that the description of the position of the bellows 11 using "under" is based on wording in the specification on page 7, lines 1 to 5, because it distinguishes from prior art absorber tubes with expansion compensation means in which a bellows is connected to an element similar to a glass-metal transitional element but follows that element axially or longitudinally. The arrangement of the applicants in which the bellows is between the glass-metal transitional element and the central metal pipe (or "under" as described on page 7 of the specification) saves space in comparison to those prior art embodiments and also helps to protect the glass-metal transitional element, from damage by reflected solar radiation as described in the specification.

In any case the "under" wording has been deleted and replaced with wording that does not depend on the point of view of the observer and thus should be considered definite.

The term "exterior" has not been used in the claims, but it is assumed that the term "outside" was meant. The terms "outside end" 13 and "inside end 12" were used in the claims 39 to 64 filed in the amendment dated February 22, 2005 to refer to the ends of the bellows 11. However the originally filed specification used the terms "outer end" and "inner end" of the bellows and claims 39 to 64

have now been amended to use these latter terms for the ends of the bellows.

There are explicit definitions for the terms "outer end" and "inner end" of the bellows on page 6, lines 8 to 14, of applicants' specification. However in the detailed description in applicants' specification the terms "outside end" and "opposite end" were used on page 12, line 3 and 5, of applicants' specification (which of course is an unfortunate inconsistency). Nevertheless one skilled in the art would understand that the end of the bellows that is opposite from the outside end would be the inner end. The original claim 3 used "interior end 12" and "outer end 13" as the terms for the end of the bellows.

Admittedly "outside" does not have the same meaning or connotation as "outer". For that reason claims 39 to 64 above have been amended to use "outer end 13" and "inner end 12" in accordance with the definitions on page 8 of the specification.

In addition, the specification on page 12 has been amended by inserting the reference number "12" of the inner end, since the figures show that the reference number "12" indicates the end of the bellow that is opposite to the outer end designated with "13".

## 2. Response to the 1st paragraph of Reasons for the 112 Rejection

The following is a response to the reasoning in the last paragraph on page 4 of the Office Action, namely to "This claims are vague and indefinite since it is unclear which portion(s) of the previously recited elements have "where the at least one expansion compensating device 10 is arranged at each of the two

ends". This statement is interpreted to mean that it is uncertain which parts of the expansion compensating device 10 are located at both ends, but if another meaning is intended, please inform us.

The present absorber pipe claims 39 to 48 and 50 and 51 claim an absorber pipe 1 that has an expansion compensation device 10, which connects a glass-metal transitional element 5 on a free end of the sleeve tube 2 with the central metal pipe 3. Thus it is clear from claim 39 that the expansion compensation device connects one end of the sleeve tube 2 with the central metal pipe 3. Thus all parts of the expansion compensation device recited in these claims cooperate to connect that one end of the sleeve tube 2 with the central metal pipe 3 and of course at the corresponding one end of the absorber tube.

The specification discloses on page 10, lines 13 and 14, that "An expansion compensation device" is preferably arranged at, i.e. connected to, both ends of the absorber tube. Thus the specification states at this point that some embodiments of the absorber tube of the invention have only one expansion compensation device that connects one end of the sleeve tube with the central metal pipe 3, while other preferred embodiments have two expansion compensation devices, one which connects one end of the sleeve tube 2 with the central metal pipe 3, while the other connects the other end of the sleeve tube 2 opposite to the one end with the central metal pipe 3.

Claim 49 claims a preferred embodiment with the expansion compensation device at both ends. However the original detailed description and

figures would only support claims for an absorber tube with "at least one expansion compensation device" or "an expansion compensation device", not plural expansion compensation devices, since only one was shown in the original claims and described in the original detailed description. Nevertheless the new figure 4 and the added paragraph to the detailed description disclose and show an expansion compensation device 10 at both ends in accordance with the disclosure on page 10 of the specification. These changes in the figures and detailed description are supported by the disclosure in the summary on page 10 of the specification.

When the specification (page 10) states that the expansion compensation device preferably is located at both ends of the absorber tube, one skilled in the art would naturally conclude that all the elements or parts of the expansion device are duplicated at each end in the preferred embodiments that have these devices at both ends of the tube, in accordance with claim 49. Otherwise the expansion compensation devices at each end would not function properly.

*The two expansion compensation devices are distinguished from each other because one connects the central metal pipe 3 to one end of the glass sleeve tube, while the other connects the central metal pipe 3 to the other end of the glass sleeve tube opposite from the one end.*

The important considerations in drafting the claims include drafting claims that are not easily avoided by a would-be infringer. Of course the structure of the absorber tube without the expansion compensation device is known. Thus an absorber tube with an expansion compensation device at one end is an

improvement over the prior art of record and could conceivably be marketed if it is not protected by adequately drafted claims. Claim 49 would cover the case of the claimed expansion compensation device being at both ends.

For the foregoing reasons and because of the changes in the claims withdrawal of the rejection of claims 39 to 64 under 35 U.S.C. 112, second paragraph, is respectfully requested.

#### **IV. Anticipation Rejection based on JP55-14455**

Claims 39 to 42 and 50 were rejected under 35 U.S.C. 102 (b) as anticipated by JP55-14455 (newly cited).

JP55-14455 discloses an absorber pipe end structure that is similar to some embodiments disclosed by Hayama, et al, and Kanatani, et al. In this end structure the outer glass sleeve tube is secured to a generally radially extending end cap, which includes an expansion compensating section, by glue or other bonding means.

In JP55-1445 a fixture or grooved section of the end cap 8 is part of the end cap and holds a glass frit 10 that is pre-sintered. The cap with the pre-sintered glass frit 10 is assembled with the glass sleeve tube and the assembly is sintered according to the abstract to make a secure connection between the glass frit and the sleeve tube. This connection device is not a glass-metal transitional element in the sense of the present invention, because there is no metal or other element that is actually inserted and fused into the end of the glass sleeve tube, e.g. as shown in figure 3 of US Patent 1,239,441 and figure 2

of US Patent 6,324,870. Instead the glass frit 10 is fused to the end of the sleeve tube 2 in the case of the prior art. The glass frit material does not actually penetrate into the end of the glass sleeve tube 2. Also the glass frit 10 is not penetrated by any part of the fixture 8, which is groove-like or cup-like structure around the periphery of the end cap.

The structure and definition of the glass-metal transitional element is described in the section of the applicants' specification extending from page 2, line 15, to page 3, about line 5.

Furthermore the expansion compensating device of the JP reference compensates dimension changes in a different direction than the expansion compensating device as claimed in claim 39. The expansion compensating device of the reference consists of a flexible diaphragm with a bellows-like section that is oriented so that it can radially expand. In contrast, the bellows 11 in the expansion compensating device of the reference is oriented in the longitudinal direction or axially since claim 39 states that the bellows 11 extends into the annular space 4 with the inner end within the annular space 4. Again the terms "inner end" and "outer end" are defined on page 8 of the applicants' specification.

Thus if an end of the central metal pipe is displaced axially or longitudinally relative to the glass sleeve tube in the prior art structure of the JP reference, undesirable forces are exerted on the end of the glass tube because the bellows or expandable section does not expand in that direction. Because the bellows is oriented axially in the applicants' expansion compensating device



these displacements are compensated by the applicants' bellows 11 and thus the undesirable forces on the sleeve tube ends do not arise.

In addition, the "bellows" section 9 of the JP reference extends in a radial direction and does not "extend into" the annular space 4, at least within the meaning of the present invention. One skilled in the art would understand claim 39 to mean that the bellows 11 extends longitudinally between the central metal pipe 3 and the glass sleeve tube 2 and between the central metal pipe 3 and the glass-metal transitional element 5, which is on a free end of the sleeve tube 2, according to claim 39 (see lines 2 to 4 of the last paragraph of claim 39 and lines 2 to 4 of the paragraph of claim 39 that defines the expansion compensating device). The flexible diaphragm 9 only extends radially, but does not extend in the manner claimed in claim 39 (especially since there is no part that is equivalent to a glass-metal transitional element).

Finally, the flexible diaphragm 9 ("bellows") and "connecting element" 4 or 5,6 of the JP reference do not "extend sufficiently into the annular space and between the glass sleeve tube and the central metal pipe, so that the glass-metal transitional element is protected from radiation" as claimed in the last paragraph of claim 39. First, the fin 3 as shown in fig. 1 of the JP reference does not block radiation entering the sleeve tube 1 from reaching the glass frit 10. Second, the bonding material, i.e. the glass frit, is itself glass and thus does not prevent light from reaching the surfaces that are bonded together.

As to dependent claim 41, the "connecting element" does not extend from the inner end of the diaphragm 9 (folding bellows) through a first circular

space between the diaphragm 9 and the metal pipe. If the flexible diaphragm 9 is considered equivalent to the bellows 11 with an inner end and an outer end, as shown in fig 1 of the JP reference, the "connecting element" extends from the center of the flexible diaphragm ("bellows"), not the inner end (interior peak of the wavy portion of element 9). The same argument can be made for allowance of claim 45 can also be made.

It is respectfully submitted that claim 41 and the claims that depend on it and claim 45 as well as the claims that depend on it should be found to contain allowable subject matter.

The following is a list of distinguishing features of claims 39 and 52 from the absorber pipe disclosed in the JP reference:

(1) there is no part in the end plate structure of the JP reference that is equivalent to or the same as the glass-metal transitional element; the fixture 8 of the end cap, which holds the glass frit 10 is not a glass-metal transitional element and has significantly different properties and behavior;

(2) the flexible diaphragm 9 of the JP reference does not extend longitudinally into the annular space 4 and is not oriented longitudinally and does not compensate for longitudinal displacements of the glass sleeve tube with respect to the central metal pipe; instead the flexible diaphragm is oriented radially and compensates for radial displacements of the sleeve tube with respect to the central metal pipe; and

(3) the flexible diaphragm 9 ("bellows") and "connecting element" 4 or 5,6 of the JP reference do not extend sufficiently into the annular space and between

the glass sleeve tube and the central metal pipe, so that a glass-metal transitional element or bonding means is protected from radiation, as claimed in the last paragraph of claim 39; this is apparent from fig. 1 of the JP reference.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15 U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

For the foregoing reasons and because of the changes in the claims, withdrawal of the rejection of amended claims 39 to 42 and 50 as anticipated under 35 U.S.C. 102 (b) by JP55-14455 is respectfully requested.

#### **V. Anticipation Rejection based on US 4,231,353**

Claims 39 to 42, 44, 45, 49, 50, 57 and 58 were rejected under 35 U.S.C. 102 (b) as anticipated by US Patent 4,231,353 (called US '353 below).

It is difficult to understand how the dependent parabolic collector claims 57 and 58 can be rejected as anticipated based on US '353, while the main independent parabolic collector claim 52 is not rejected as anticipated based on US '353.

US Patent 4,231,353 discloses an absorber pipe with a transparent outer tube 9 preferably made of glass and an inner metal pipe 10 passing through it with a heat collecting fin 11 in thermal contact with the inner metal pipe 10. The cylindrical soda glass member 10 has metallic end plates 12 on each end closing

it (claim 1 and column 2, line 56, to column 3, last line).

The metallic end plates have an annular groove around their periphery and are hermetically joined with the ends of the outer tube 9 by means of a bonding material 18 which is "an initially flowable sealing substance" (claim 1; column 5, line 3 to 4) - which is preferably a lead-containing oxide glass (claim 4; column 3, lines 16 to 19).

The bonding means of Kanatani, et al, is not a glass-metal transitional element in the sense of the present invention, because one end of a metal element is not actually inserted and fused into the end of the glass sleeve tube, e.g. as shown in figure 3 of US Patent 1,239,441 and figure 2 of US Patent 6,324,870. Instead the plumbic glass bonding material (claim 4 of the reference) is fused with the end of the sleeve tube 2 in the case of the prior art. Also the plumbic glass bonding material is not penetrated by any part of the annular groove 14 of the end cap. The fused glass bonding material only bonds to the surfaces of the part 14 of the end cap and the ends of the glass sleeve tube.

The structure and definition of the glass-metal transitional element is described in the section of the applicants' specification extending from page 2, line 15, to page 3, about line 5.

Furthermore the expansion compensating device of the US '353 reference is similar to the compensating device of the JP reference in that it compensates dimension changes primarily in a radial direction, instead of a longitudinal direction. In contrast, the bellows 11 in the expansion compensating device of claim 39 compensates displacements in the longitudinal direction, since it

extends into the annular space 4 with the inner end within the annular space 4. This relieves forces or stresses on the end of the glass sleeve tube in contrast to the connecting device of US '353.

Finally, contrary to the statement in the Office Action the end plate 12 with the annular expandible portion 15, or the annular expandible portion 15 itself, does not "extend sufficiently into the annular space and between the glass sleeve tube and the central metal pipe, so that a glass-metal transitional element (or bonding means) is protected from radiation" as claimed in the last paragraph of claim 39. To assert the opposite is to ignore the fact that the longitudinally oriented fin 11 does not prevent radiation entering at an angle through the center of the tube from reaching the sealing material 18 between the end of the outer tube and the metal end plate. Also the plumbic glass bonding material does not prevent light from reaching the surfaces that are bonded together.

As to dependent claim 41, the "connecting element" does not extend from the inner end of the metal end plate through a first circular space between the metal end plate and the central metal pipe. If the metal end plate or expandable portion 15 is considered equivalent to the bellows 11 with an inner end and an outer end, as shown in figs 3 and 6 of the reference, the "connecting element" extends from the center of the flexible diaphragm ("bellows"), not the inner end (interior peak of the wavy portion of portion 15). The same argument can be made for allowance of claim 45 can also be made.

It is respectfully submitted that claim 41 and the claims that depend on it and claim 45 as well as the claims that depend on it should be found to contain

allowable subject matter.

The following is a list of distinguishing features of claims 39 and 52 from the absorber pipe disclosed in US '353:

(1) there is no part in the end plate structure of US '353 that is equivalent to or the same as the glass-metal transitional element; the plumbic oxide glass bonding material, which fastens the metal end cap to the outer tube is not a glass-metal transitional element and has significantly different properties and behavior;

(2) the expandable portion 15 of US '353 not extend longitudinally into the annular space 4 and is not oriented longitudinally or axial; it does not compensate for longitudinal displacements of the glass sleeve tube with respect to the central metal pipe; instead it compensates for radial displacements of the sleeve tube with respect to the central metal pipe; and

(3) expandable portion 15 and "connecting element" of US '353 do not extend sufficiently into the annular space and between the glass sleeve tube and the central metal pipe, so that a "glass-metal transitional element" (which is not present in this reference) or bonding means in the case of this reference is protected from radiation, as claimed in the last paragraph of claim 39; this is apparent from the drawing of US '353.

It is well established that each and every limitation of a claimed invention must be disclosed in a single prior art reference in order to be able to reject the claimed invention under 35 U.S.C. 102 (b) based on the disclosures in the single prior art reference. See M.P.E.P. 2131 and also the opinion in *In re Bond*, 15

U.S.P.Q. 2nd 1566 (Fed. Cir. 1990).

For the foregoing reasons and because of the changes in the claims, withdrawal of the rejection of amended claims 39 to 42, 44, 45, 49, 50, 57 and 58 as anticipated under 35 U.S.C. 102 (b) by US Patent 4,231,353 is respectfully requested.

#### **VI. Obviousness Rejection**

Claims 43, 48, 51 to 56 and 61 to 64 were rejected as obvious under 35 U.S.C. 103 (a) over JP55-14455 or US Patent 4,231,353, in view of Hayama, et al (U.S. Patent 4,133,298).

The subject matter of JP55-14455 or US Patent 4,231,353 has been described above.

Hayama, et al. does not disclose or suggest the features and limitations of claims 39 to 64 listed above in the REMARKS regarding the anticipation rejections, which distinguish the subject matter of the applicants' claims from the disclosures in JP55-14455 or US Patent 4,231,353.

First, Hayama, et al, do not disclose or suggest a glass-metal transitional element like applicants' element 5 between the end of the glass sleeve tube and the end plate (as it is called in the prior art or the bellows as in the claimed invention). Neither the embodiment of figure 12 nor figure 13 shows that structure. Figure 13, is like the end cap structures of JP55-14455 and US Patent 4,231,353. This embodiment uses powdered lead glass to bond the end of the outer cylinder 11 to the cap 100 (column 5, lines 25 to 30, of Hayama, et al). In

the embodiment of figure 12 also there is no glass-metal transitional element. The expandible member 15 (similar to applicants bellows) is "attached with wax" to one end of a guide pipe 14.

Second, Hayama, et al, do not disclose or suggest the feature that the expandible portion of the end plate (fig. 13) or the bellows (fig. 12) and its "connecting element" of US '353 extend sufficiently into the annular space and between the glass sleeve tube and the central metal pipe, so that a glass-metal transitional element or bonding means in the case of the embodiment of fig. 13 is protected from radiation as claimed in the last paragraph of claim 39; this is apparent from the figures of Hayama, et al.

Of course Hayama, et al, do disclose mirror surfaces that reflect radiation back to the central metal pipe.

It is well established that there must be a hint or suggestion of the modifications of the disclosures of the prior art references used to reject a claimed invention under 35 U.S.C. 103 (a) for a valid 103 rejection. For example, the Federal Circuit Court of Appeals has said:

"The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification....It is impermissible to use the claimed invention as an instruction manual or "template" to piece together the teachings of the prior art so that the claimed invention is rendered obvious. This court has previously stated that "one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention." *In re Fritch*, 23 U.S.P.Q. 2nd 1780, 1781-84 (Fed. Cir. 1992).



For the foregoing reasons and because of the changes in the amended claims, withdrawal of the rejection of claims 43, 48, 51 to 56 and 61 to 64 as obvious under 35 U.S.C. 103 (a) over JP55-14455 or US Patent 4,231,353, in view of Hayama, et al (U.S. Patent 4,133,298) is respectfully requested.

#### **VI. New Claim 65**

A new more limited claim 65 that is further distinguished from the art has been filed. The new claim 65 includes the features of claim 64 and the additional features that the bellows extends in the longitudinal direction into the annular space 4. The basis for this change is found on page 8, lines 3 to 4, of the applicants' originally filed specification. Also the additional limitation that the connecting element 15, 15', 15" either extends *in a longitudinal direction* between the bellows 11 and the central metal pipe 3 or between the bellows 11 and the glass sleeve tube 2 has been added. The figures provide a basis for this other additional limitation.

None of the embodiments of the cited prior art, except fig. 12 of Hayama, et al, show the bellows extending in the longitudinal direction into the annular space 4 or along the absorber tube. Thus claim 65 is further distinguished from the subject matter of the references than claim 39.

#### **VIII. Allowable Subject Matter**

The indication of allowable subject matter in claims 46, 47, 59 and 60 is gratefully acknowledged. Unfortunately this only covers the embodiment of figure

2, so that there is no protection for the embodiments shown in figures 1 and 3. it is hoped that agreement can be reached which provides broader patent claim coverage.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,



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